

CLAIMS

What is claimed is:

1. A method, comprising measuring packet round trip times within a communication network, and extracting from the round trip time measurements information regarding congestion conditions within the network
2. The method of claim 1 wherein the packet round trip time measurements are organized as an invariant distribution prior to the extracting of information regarding congestion conditions.
3. The method of claim 2 wherein the extraction of information regarding congestion condition is performed using an analytical tool which reveals periodicity information in the invariant distribution.
4. The method of claim 3 wherein the analytical tool is selected from the list comprising a Fourier transform and a wavelet transform.
5. The method of claim 2 wherein extraction of information regarding congestion conditions comprises determining period information of the information organized as the invariant distribution.
6. The method of claim 2 wherein the extraction of information regarding congestion conditions further comprises determining bandwidth information of the information organized as the invariant distribution.
7. The method of claim 6 further comprising using the bandwidth information to set a control bandwidth output of a network node.
8. The method of claim 7 wherein the control bandwidth output is set by adjusting inter-packet transmission times at the network node.

9. The method of claim 8 further comprising adjusting the control bandwidth output in response to changing network congestion conditions.
10. A method, comprising controlling inter-packet transmission times at a node of a communication network according to congestion conditions within the network, the congestion conditions being determining by measurement of packet round trip times within the network.
11. The method of claim 10 wherein the congestion conditions are determined by extracting bandwidth information regarding one or more congested links within the network from an invariant distribution of the round trip times measurements.
12. The method of claim 11 further comprising identifying bandwidth bottlenecks from the bandwidth information.
13. The method of claim 12 wherein the inter-packet transmission times are controlled so as to provide a packet bandwidth approximately equal to a bandwidth of at least one of the bandwidth bottlenecks.
14. The method of claim 11 wherein the bandwidth information is extracted using an analytical tool which exposes periodicity information in the invariant distribution.
15. The method of claim 14 wherein the analytical tool is selected from the list comprising a fourier transform and a wavelet transform.
16. A method comprising estimating congestion in a communication network from bandwidth bottleneck information obtained through measurements of packet round trip times within the network.
17. The method of claim 16 further comprising controlling packet transmissions from a node of the network according to the bandwidth bottleneck information.

18. The method of claim 16 wherein the bandwidth bottleneck information is obtained by analyzing the measurements of packet round trip times using an analytical tool which reveals periodicity information within an invariant distribution of the measurements of packet round trip times.

19. The method of claim 18 wherein the analytical tool is selected from list comprising a fourier transform and a wavelet transform.

20. The method of claim 18 further comprising controlling inter-packet transmission times at a node of the network according to the bandwidth bottleneck information.